ISSN 2189-7093 PRINT ISSN 0919-1038

KURRI Progress Report 2017

Institute for Integrated Radiation and Nuclear Science, Kyoto University

KURRI Progress Report 2017

APRIL 2017 - MARCH 2018

Published by Institute for Integrated Radiation and Nuclear Science, Kyoto University, Kumatori-cho, Sennan-gun, Osaka 590-0494 Japan

CONTENTS

PROJECT	RESEARCHES
Project 1	Analyzing Tumor Microenvironment and Exploiting its Characteristics in Search of Optimizing Cancer Therapy Including Neutron Capture Therapy Si. Masunaga (29P1)
PR1-1	
PR1-2	-
PR1-3	HIF-1 Maintains a Functional Relationship between Pancreatic Cancer Cells and Stromal Fibroblasts by Upregulating Expression and Secretion of Sonic Hedgehog M. Kobayashi <i>et al.</i> (29P1-3)
PR1-4	•
PR1-5	
PR1-6	K. Nakai <i>et al.</i> (29P1-10)
PR1-7	Y. Matsumoto <i>et al.</i> (29P1-11)
PR1-8	Attempts to Sensitize Tumor Cells by Exploiting the Tumor Microenvironment Y. Sanada and S. Masunaga (29P1-12)
Project 2	Production Mechanism of Radioactive Aerosols Released from Fukushima Daiichi Nuclear Power Plant K. Takamiya (29P2)
PR2-1	Effect of Solute on Attachment Behavior of Fission Product to Solution Aerosol Particle
PR2-2	Diffusion Battery System
	Y. Oki and N. Osada (29P2-2)
Project 3	Project Research on Development of Scattering Spctrometers Utilizing Small and Medium Class Neutron Source M. Sugiyama (29P3)
PR3-1	Determination of Degree of Deutteartion Level of Deuterated Protein Through Small-angle Neutron Scattering R. Inoue <i>et al.</i> (29P3-1)
PR3-2	
PR3-3	Characterization of Nanostructure in Metallic Materials using Small-Angle Scattering Y. Oba <i>et al.</i> (29P3-3)
PR3-4	Nanostructure of Hydrated α-, γ-, ω-Gliadins R. Urade <i>et al.</i> (29P3-4)
PR3-5	Nano Structure of Metal Hydride by X-ray Small Angle Scattering K. Iwase <i>et al.</i> (29P3-6)

Project 5	Project Research on a Study on Biological Character and Use of the Particle Induced by the Boron Neutron Capture Reaction Y. Kinashi (29P5)	22
PR5-1	Biological Effects of DNA Alkylating Agents on the Cell Lethal Effects of BNCR Y. Kinashi <i>et al.</i> (29P5-1)	23
Project 6	Improvement of Characterization Techinques in High-Energy-Particle Irradiation Research	
	A. Kinomura (29P6)	24
PR6-1	A. Kinomura et al. (29P6-1)·····	25
PR6-2	Electron-Irradiation Effects on Diffusion Coefficient of Cu in Fe Studied by Three Dimensional Atom Probe T. Toyama <i>et al.</i> (29P6-2)	26
PR6-3	Change in Positron Annihilation Lifetime of Vacancies by Hydrogen Charging in Tungsten K. Sato <i>et al.</i> (29P6-3)	27
PR6-4	Gamma-ray Irradiation Effect on ZnO Bulk Single Crystal K. Kuriyama <i>et al.</i> (29P6-4)	28
PR6-5	Establishment of Technique for Thermal Diffusivity Measurement using TEM Disk Size Miniature Test Specimens for Post-irradiation Experiments M. Akiyoshi <i>et al.</i> (29P6-5)	29
PR6-6	Positron Annihilation Study of Fe-Cr binary alloy after Electron Irradiation T. Onitsuka <i>et al.</i> (29P6-6)	30
PR6-7	Study on Free Volume in Diamond-like Carbon Thin Films by Positron Annihilation Spectroscopy K. Kanda <i>et al.</i> (29P6-7)	31
PR6-8	Thermal Stability of Diamond-like Carbon Films S. Nakao <i>et al.</i> (29P6-8)	32
Project 7	Development on Neutron Imaging Application Y. Saito (29P7)	33
PR7-1	Dynamic Observation of Two-Phase Flow using Neutron Radiography Y. Saito and D. Ito (29P7-1)	34
PR7-2	Visualization and Measurement of Boiling Flow Behaviors in Parallel Mini-channel Heat Exchanger H. Asano <i>et al.</i> (29P7-2, P7-3)	35
PR7-3	Flow Visualization of Heavy Oil in Packed Bed Reactor by Neutron Radiography T. Tsukada <i>et al.</i> (29P7-4)	36
PR7-4	Trial Measurement of Void Fraction in Boiling Channel H. Umekawa <i>et al.</i> (29P7-5)	37
PR7-5	Estimation of the Frost Formation on the Heat Exchanger by Using Neutron Radiography R. Matsumoto <i>et al.</i> (29P7-6)	38
PR7-6	Study on the Visualization of Organic Matter between Metals in order to Contribute to the Advancement of the Industrial ProductsK. Hirota <i>et al.</i> (29P7-12)	39
PR7-7	On the Luminescence of Helium Excimer Clusters Via Neutoron-3He Absorption Reaction Y. Tsuji <i>et al.</i> (29P7-13)	40
PR7-8	Development of Capillary-Plate-Based Flourescent Plates T. Sakai <i>et al.</i> (29P7-14)	41
Project 8	Project Research on Nuclear Spectroscopy and Condensed Matter Physics Using Short-Lived Nuclei Y. Ohkubo (29P8)	42
PR8-1	Isomer Search for Fission Products around $A=150$ with Energy-sum γ -ray Spectrometry M. Shibata <i>et al.</i> (29P8-2)	43
PR8-2	Compton Polarimeter for β -delayed γ Rays Using Clover Detector S. Ohno <i>et al.</i> (29P8-3)	44

PR8-3	Nuclear Spin Relaxation of ¹¹¹ Cd at the <i>A</i> Site in a Spinel Oxide CdIn ₂ O ₄ W. Sato <i>et al.</i> (29P8-5)	45
PR8-4	Observation of Local Fields at the ¹¹¹ Cd(← ^{111m} Cd) Sites in Cadmium Titanate S. Komatsuda <i>et al.</i> (29P8-6)·····	46
Project 9	Project Research of Accelerator-Driven System with Spallation Neutrons at Kyoto University Critical Assembly C. H. Pyeon (29P9)	47
PR9-1	Subcriticality Monitoring for a Reactor System Driven by Spallation Source K. Hashimoto <i>et al.</i> (29P9-1)	48
PR9-2	Basic Study of Beam Transient on Accelerator-Driven System with Spallation Neutron Source N. Aizawa <i>et al.</i> (29P9-2)	49
PR9-3	Measurement of MA Reaction Rates Using Spallation Neutron Source A. Oizumi <i>et al.</i> (29P9-3)	50
PR9-4	Irradiation Experiments of ²³⁷ Np and ²⁴¹ Am Capture and Fission Reactions in Critical Core W. F. G van Rooijen <i>et al.</i> (29P9-4)	51
PR9-5	Development of Real-time Subcriticality Monitor K. Watanabe (29P9-5)	52
PR9-6	Neutronics of Accelerator-Driven System with Spallation Neutrons C. H. Pyeon and M. Yamanaka (29P9-6)	53
Project 10	Preclinical Study for Development of New Drug for NCT M. Suzuki (29P10)	54
PR10-1	The Synthesis and Biological Evaluation of Fluorescein-Tagged 1-methyl-o-carborane for Boron Neutron Capture Therapy L. Kuzmanic <i>et al.</i> (29P10-1)·····	55
PR10-2	New Self-assembling Peptide Drug Delivery System with BSH against Human Glioblastoma Cell in BNCT H. Michiue <i>et al.</i> (29P10-2)	56
PR10-3	Functionalization of Hexagonal Boron Nitride Nanosheet with Polyglycerol and its Biomedical Application M. Kyouhei and K. Naoki (29P10-3)	57
PR10-4	Exploring the Use of the Chicken Egg CAM Assay as an Animal Model for BNCT K. Matsumoto <i>et al.</i> (29P10-4)·····	58
PR10-5	Next Generation A (Aomori) - Research and Development of Novel Boron Drugs in BNCT Therapy S. Ishiyama <i>et al.</i> (29P10-5) ······	59
PR10-6	Spherical Particle Fabrication of Boron-Iron Complex Material for BNCT Agent with Magnetic Property Y. Ishikawa <i>et al.</i> (29P10-6)	60
PR10-7	Gadolinium-loaded Chitosan Nanoparticles for Neutron Capture Therapy of Cancer: Influence of Particle Size on Tumor-killing Effect <i>in vitro</i> T. Andoh <i>et al.</i> (29P10-7) ······	61
PR10-8	Evaluation of Boron Neutron Capture Therapy Using Tumor Model Rats or Mice T. Kanematsu <i>et al.</i> (29P10-8)	62
PR10-9	Development of S-Alkylthiododecaborate Containing Amino Acids for BNCT Y. Hattori <i>et al.</i> (29P10-9)	63
PR10-1	 In vivo Evaluation of Novel Boron-Containing Compounds for BNCT W. Kurosawa <i>et al.</i> (29P10-10) 	64
PR10-1 1	 Development of an Actively-Targeted, Phenylboronic Acid-Installed Nanoparticle Towards Next-Generation Boron Neutron Capture Therapy Y. Nagasaki <i>et al.</i> (29P10-11) 	65
PR10-12		66
PR10-1.		67

PR10-14	Development of Boron Cluster Containing Water-Soluble Folate Derivatives As Novel Small Molecular Agents for BNCT H. Nakamura <i>et al.</i> (29P10-14)	68
PR10-15	Evaluation of Novel Boron Liposome <i>in vivo</i> by Thermal Neutron Irradiation M. Shirakawa <i>et al.</i> (29P10-15)	69
PR10-16	<i>In vivo</i> Anti-tumour Evaluation of new Boron-containing Compound BN2018 for BNCT R. Ubagai <i>et al.</i> (29P10-16)	70
Project 11 C M	Clinical Research on Explorations into New Application of BNCT <i>I.</i> Suzuki (29P11)	71
PR11-1	Clinical Research on Explorations into New Application of BNCT M. Suzuki <i>et al.</i> (29P11-1)	72
PR11-2	Pilot Study of Single Dose Toxicity Evaluation of ¹⁰ BSH entrapped WOW emulsion on intra-arterial delivery in Pig for Neutron Capture Therapy to Hepatocellular Carcinoma H. Yanagie <i>et al.</i> (29P11-3)	73
Project 12 E Y	Establishment of Integrated System for Dose Estimation in BNCT Z. Sakurai (29P12)	74
PR12-1	Establishment of Characterization Estimation Method in BNCT Irradiation Field using Bonner Sphere and Ionization Chamber Y. Sakurai <i>et al.</i> (29P12-1)	75
PR12-2	Basic Study on New Type of Neutron Spctrometer for Epi-thermal Energy Region A. Uritani <i>et al.</i> (29P12-2)	76
PR12-3	Improvement of SOF Detector System for Long-term Stability M. Ishikawa <i>et al.</i> (29P12-3)	77
PR12-4	Resopnse of a Commercial CsI Detector for the Self-activation Method in BNCT Field A. Nohtomi <i>et al.</i> (29P12-4)	78
PR12-5	Neutron Beam Quality and dose Measurement of the Kyoto University Research Reactor Using Microdosimetric Technique N. Ko <i>et al.</i> (29P12-5)	79
PR12-6	Study for Microdosimetry using Silicon-on-insulator Microdosimeter in the BNCT Irradiation Field Y. Sakurai <i>et al.</i> (29P12-6)	80
PR12-7	Estimation of dose Resolution by Gel Detector for BNCT R. Maruta <i>et al.</i> (29P12-7)·····	81
PR12-8	Study on the Development of Neutron Fluence Distribution Measurement Device using Thermoluminescence of the Ceramic Plates K. Shinsho <i>et al.</i> (29P12-8)	82
PR12-9	The Study for Development and Application of Tissue Equivalent Neutron Dosimeter M. Oita <i>et al.</i> (29P12-9)	83
PR12-10	Development and Evaluation of 3D Polymer Gel Dosimeter for the Measurement of dose Distribution in BNCT S. Hayashi <i>et al.</i> (29P12-10)	84
PR12-11	Establishment of Beam-quality Estimation Method in BNCT Irradiation Field using Dual Phantom Technique Y. Sakurai <i>et al.</i> (29P12-11)	85
PR12-12	Development of Real-time dose Monitor Using Prompt Rays Imaging Detector for Boron Neutron Capture Therapy H. Tanaka <i>et al.</i> (29P12-12)·····	86
PR12-13	Development of Novel Organic Scintillator for Fast Neutron and Its Evaluation in KUR S. Kurosawa <i>et al.</i> (29P10-13)	87
PR12-14	Patient-Position Monitoring System for BNCT Irradiation T. Tanaka <i>et al.</i> (29P12-14)·····	88

I-2. COLLABOR	ATION RESEARCHES	89
1. Slow Neutr	ron Physics and Neutron Scattering	
CO1-1	Morphological Control in PS-b-PI-b-PDMS Triblock Copolymer by Mixed-Solvent M. Takenaka <i>et al.</i> (29002)	90
CO1-2	Oligomeric Structures of HSPB5 Variants M. Yohda <i>et al.</i> (29004)	91
CO1-3	Effect of Cancer Associated Histone Mutations in the Nucleosome Structure Y. Arimura <i>et al.</i> (29007)	92
CO1-4	Nanostructure in Ferromagnetic Au Nanoparticles T. Sato <i>et al.</i> (29015) ·····	93
CO1-5	Development of Neutron Imager Basded on Hole-type MPGD with Glass Capillary Plate F. Tokanai <i>et al.</i> (29055)	94
CO1-6	Current Status of B–3 Beam Port of KUR, 2017 K. Mori <i>et al.</i> (29063)	95
C01-7	Study of the Properties of Water and the Physiological Activation Phenomena by using High-Intensity Pulsed Coherent Radiation S. Okuda <i>et al.</i> (29073)	96
CO1-8	First Neutron Focusing Test with a Couple of 900mm Long Ellipsoidal Supermirrors M. Hino <i>et al.</i> (29079)	97
CO1-9	Hydrogen Retention on Plasma Facing Material Irradiated by High Energy Particle Beam K. Tokunaga <i>et al.</i> (29096)	98
2. Nuclear Pl	hysics and Nuclear Data	
CO2-1	Study on Neutron Beam Pulse width Dependence in the Nuclear Fuel Measurement by the Neutron Resonance Transmission Analysis F. Kitatani <i>et al.</i> (29041)	99
CO2-2	Measurement of Doppler Effect by Small Accelerator Neutron Source (II) T. Sano <i>et al.</i> (29065)	100
CO2-3	Study on the Non-destructive Nuclide Assay for Nuclear Materials with a Self-indication Method J. Hori <i>et al.</i> (29066)	101
CO2-4	Development of Gamma Imager and Its Application to Identification of Nuclear Materials H. Tomita <i>et al.</i> (29068)	102
CO2-5	Measurements of Epithermal Neutron Detector with a Boron Loaded Plastic Scintillator T. Matsumoto <i>et al.</i> (29072)	103
CO2-6	Study of Isotope Separation via Chemical Exchange Reaction R. Hazama <i>et al.</i> (29099)	104
CO2-7	Reactivity Measurement of Accident Tolerant Control Rod Materials H. Ohta <i>et al.</i> (CA2908)	105
3. Reactor Ph	nysics and Reactor Engineering	
CO3-1	Basic Research for Sophistication of High-power Reactor Noise Analysis S. Hohara <i>et al.</i> (29093)	106
CO3-2	Irradiation Experiments of ²³⁷ Np and ²⁴¹ Am Foils for Fission Reactions by 14 MeV Neutrons G. Chiba <i>et al.</i> (CA2901)	107
CO3-3	Neutronics of U-Fueled and Pb-Zoned Core in Accelerator-Driven System C. H. Pyeon <i>et al.</i> (CA2902)	108
CO3-4	Subcriticality Measurement by Advanced Rossi- <i>a</i> Fitting in Accelerator-Driven System C. Kong <i>et al.</i> (CA2903)	109
CO3-5	Measurement of Bismuth Sample Reactivity Worth in A-core of KUCA for ADS M. Fukushima <i>et al.</i> (CA2904)	110
	V	

CO3-6	Measurement ²³⁸ U(n, γ) γ ray from Subcritical System Y. Nauchi <i>et al.</i> (CA2906)	111
CO3-7	Development of New Optical Fiber Type Neutron Detector for Reactor Physics Experiments K. Watanabe <i>et al.</i> (CA2907)	
CO3-8	Measurement of Fundamental Characteristics of Nuclear Reactor at KUCA (II) Y. Kitamura <i>et al.</i> (CA2909)	112
CO3-9	Baisc Nuclear Characteristc Measurements at Subcritical Core T. Misawa <i>et al.</i> (CA2910)	114
4. Material Sci	ience and Radiation Effects	
CO4-1	Effect on the Switch of the Helicity of Poly (quinoxaline-2,3-diyl)s: A Structural Analysis by Small-Angle X-ray Scattering Y. Nagata <i>et al.</i> (29001)	115
CO4-2	Nanostructures in Semiconductor Nanocomposite Thin Films Y. Oba <i>et al.</i> (29009)	116
CO4-3	Measurement of Electron Emission Properties of Field Emitter Array under Gamma-ray Irradiation Y. Gotoh <i>et al.</i> (29014)	117
CO4-4	Evaluation of Unintentionally Doped Impurities in Sillicon Carbide Substrates using Nutron Activation Analysis Technics T. Makino <i>et al.</i> (29026)	118
CO4-5	Spectrum of Amino Acid in the Millimeter-wave Region using a Diode Detector T. Takahashi (29028)	119
CO4-6	Correlation between Neutron Irradiation Damages and Hydrogen Isotope Retention Y. Oya <i>et al.</i> (29032)	120
CO4-7	Sub-THz Absorption Bands of Ionic Liquids T. Awano and T. Takahashi (29035)	121
CO4-8	The Correlation between Microstructural Evolution and Mechanical Property Changes in Neutron-irradiated Vanadium Alloys K. Fukumoto <i>et al.</i> (29036)	122
CO4-9	Defects Structure of Electron Irradiated B2 Ordered Alloys F. Hori <i>et al.</i> (29039)	123
CO4-10	Synthesis of Multi-component Metal Nanoparticles by γ-ray Irradiation Reduction Method F. Hori <i>et al.</i> (29040)	124
CO4-11	Radioactivation of Accident Tolerant Control Rod Materials H. Ohta <i>et al.</i> (29042)	125
CO4-12	Neutron Irradiation Effect of High-density MoO ₃ Pellets for Mo-99 Production Y. Suzuki <i>et al.</i> (29047)	126
CO4-13	Reserch on Resonance Frequency Variation as Function of Exposure Radiation Dose M. Kobayashi <i>et al.</i> (29050)	127
CO4-14	Selection of Borosilicate Glass Composition for Neutron Irradiation Test T. Nagai <i>et al.</i> (29056)	128
CO4-15	Formation of Nano-porous Structures on Whole Surface of Ge Wafer by High-energy Ion Irradiation J. Yanagisawa <i>et al.</i> (29061)	129
CO4-16	Development of ⁵⁷ Co Mössbauer Source using KURRI-LINAC Y. Kobayashi <i>et al.</i> (29082) ·····	130
CO4-17	Electrolytic Reduction of Calcium Oxide in CaCl ₂ -KCl Molten Salt Using Liquid Tin Cathode H. Sekimoto <i>et al.</i> (29088)	131
CO4-18	Development of Mössbauer Spectroscopy for Various Isotopes S. Kitao <i>et al.</i> (29089)	132
CO4-19	¹⁹⁷Au Mössbauer Study of Au AcetylidesY. Kobayashi <i>et al.</i> (29091)	133

CO4-20	Complex Structure of Ions Coordinated with Hydrophilic Polymer 18. Application for Metaric Plating on Resin Surface (2) A. Kawaguchi and Y. Morimoto (29097)	134
CO4-21	Study on Metal Surface Wettability Enhanced by Radiation Induced Surface Activation T. Hazuku <i>et al.</i> (29098)	135
CO4-22	Characterization of Heterogeneous Nanostructures Formed in Stainless Steel using Small-Angle Scattering Y. Todaka <i>et al.</i> (29101)	136
CO4-23	Research on Spin Density Wave in Mixed Anion Layered compounds, Sr ₂ VFeAsO _{3-δ} Y. Tojo <i>et al.</i> (29105)·····	137
CO4-24	Vacancy Migration Behavior in a CoCrFeMnNi High Entropy Alloy K. Sugita <i>et al.</i> (29106) ······	138
CO4-25	Positron Age-MOmentum Correlation (AMOC) Measurements on Gamma-ray Irradiated Polystyrene H. Tsuchida <i>et al.</i> (29108)	139
CO4-26	Establishment of Mössbauer Spectroscopy on Rare Earth Er H. Yokota <i>et al.</i> (29138)	140
CO4-27	Dose Response and Mechanism of Radiophotoluminescence Phenomenon Induced by γ-ray Irradiation in Cu-doped Glass R. Hashikawa <i>et al.</i> (29140)	141
5. Geochemistr	y and Environmental Science	
CO5-1	INAA and Ar-Ar Dating for Small Extraterrestrial Materials R. Okazaki and S. Sekimoto (29008)	142
CO5-2	Volcanic and Tectonic History of Intra-oceanic Island Arc Revealed by ⁴⁰ Ar/ ³⁹ Ar Dating Technique O. Ishizuka <i>et al.</i> (29011)	143
CO5-3	I-Xe Age of a Brecciated Meteorite, NWA2139 H. Sumino <i>et al.</i> (29024)	144
CO5-4	Clear Descent of Antimony(Sb) Concentration in Atmospheric Aerosol Observed at Sakai, Osaka from 1995 to 2017 N. Ito <i>et al.</i> (29031)	145
CO5-5	A Study on the Sedimentary Environment of Tokyo-Bay Sediments under Hypoxia Using Instrumental Neutron Activation Analysis M. Matsuo <i>et al.</i> (29034)	146
CO5-6	Ionic Exchange of Tritium in Water and Hydrogen in Hydroxides H. Hashizume <i>et al.</i> (29044)	147
CO5-7	Determination of Abundance of Rare Metal Elements in Seafloor Hydrothermal Ore Deposits by INAA Techniques-4: Evaluation of Analytical Accuracy J. Ishibashi <i>et al.</i> (29064)	148
CO5-8	Ar-Ar Determinations of Petit-spot Submarine Volcanoes N. Hirano <i>et al.</i> (29067)	149
CO5-9	Basic Study on Radiation-induced Luminescence from Natural Mineral H. Fujita <i>et al.</i> (29070)	150
CO5-10	Trace Amounts of Halogens (Cl, Br and I) in Andesite and Basalt Reference Materials S. Sekimoto <i>et al.</i> (29076)	151
CO5-11	Application of Neutron Activation Analysis to Micro Gram Scale of Solid Samples S. Sekimoto <i>et al.</i> (29077)	152
CO5-12	Comparison of Extractable Organochlorine and Organobromine Speciated by Molecular Weight in Various Environmental Matirices K. Mukai <i>et al.</i> (29085)	150
CO5-13	K. Mukai <i>et al.</i> (29085) Chemical Compositions of Chromitite Reference Materials (CHR-Bkg and CHR-Pt+) N. Shirai <i>et al.</i> (29087)	153 154
CO5-14	Fission Track Dating and Thermal History of Hydrothermally Altered Rock Sample H. Ohira and A. Takasu (29095)	155

CO5-15	Thermal History of Precambrian Metamorphic Rocks	
	H. Hyodo <i>et al.</i> (29112)	156
CO5-16	Applicability Verification of Isotopic Analysis of Cs by TIMS	
	Y. Shibahara <i>et al.</i> (29115)	157
CO5-17	Characteristics of Calcite Thermoluminescence and Its Use for Age Estimate	
	N. Hasebe <i>et al.</i> (29136)	158
CO5-18	Studies on the Binding Mechanism and Stoichiometry of Mercury Atoms in an	
	Organomercury Lyase from Smeared Solution by an in-cell Radioactivation Analysis	
	K. Takamiya and Y. Morimoto (29143)	159

6. Life Science and Medical Science

CO6-1	Structural Study for Higher Ordered Chromatin H. Kurumizawa and M. Sugiyama (29003)	160
CO6-2	Structural Study for the S. <i>pombe</i> Overlapping Dinucleosome M. Koyama <i>et al.</i> (29005)	161
CO6-3	Molecular Mechanism of the Interaction between Transcriptional Factors Sp1 and TAF4 E. Hibino <i>et al.</i> (29006)	162
CO6-4	Study of Localization Estimation of Abasic Sites in DNA Exposed to Radiomimetic Chemicals and ⁶⁰ Co γ-rays K. Akamatsu <i>et al.</i> (29010)	163
CO6-5	SAXS Study on the Structure of Prefibrillar Intermediates for the Formation of Insulin B Chain Amyloid Fibrils N. Yamamoto <i>et al.</i> (29012)	164
CO6-6	Possible Involvement of Aspartyl L-to-D Isomerization of Cell Adhesion Molecule-1 Shedding Products in Neurodegeneration A. Ito and N. Fujii (29019)	165
CO6-7	Structural Characterization of Circadian Clock Potein Complexes H. Yagi <i>et al.</i> (29022) ·····	166
CO6-8	Measurement of Trancemitance Spectra of a Humann Calcificated Aorta Tissue in the Sub-Terahertz Region N. Miyoshi and T. Takahashi. (29029)	167
CO6-9	Study of the Radioresistance Mechanisms of Radioresistant Bacteria T. Saito <i>et al.</i> (29048)	168
CO6-10	Conformational Characterization of Archaeral Homolog of Proteasome-assembly Chaperone PbaA M. Yagi-Utsumi <i>et al.</i> (29054)	169
CO6-11	Dynanic Light Scattering of Ribonuclease A S. Fujiwara <i>et al</i> (29059) ······	170
CO6-12	Characterization of Conformational Deformation-coupled Interaction between Immunoglobulin G1 Fc Glycoprotein and a Low-affinity Fcg Receptor S. Yanaka <i>et al.</i> (29062)	171
CO6-13	ATP-dependent Solution Structure of Multi-domain Protein, MurD H. Nakagawa <i>et al.</i> (29074)	172
CO6-14	Production of Medical Radioisotopes Using Electron Linear Accelerator S. Sekimoto and T. Ohtsuki (29078)	173
CO6-15	Chatacterization of Resonance Hybrid of Fe-bound Oxygen in Myoglobin K. Hasegawa <i>et al.</i> (29084)	174
CO6-16	Potential of Boron Neutron Capture Therapy (BNCT) for Metastatic Bone: study with Human Breast Cancer-bearing Animal Model T. Fujimoto <i>et al.</i> (29125)	175
CO6-17	Preparation of F1Fo-ATP Synthase as a Whole Body Complex from Bovine Heart for Structural Analysis by Cryo-electron Microscopy and X-ray Crystallography C. Jiko <i>et al.</i> (29142)	176

7. Neutron Capture Therapy

CO7-1	A Trial Experiment for Establishment of Material Data Base for Low Activation Design Method by Neutron Activation Analysis with KUR K. Kimura <i>et al.</i> (29043)	177
CO7-2	The Feasibility Study of Eu:LiCaF Neutron Detector for an Accelerator-based BNCT D. Nio <i>et al.</i> (29058)	178
CO7-3	Development of <i>closo</i> -Dodecaborate-Conjugated Serum Albumins as Novel Boron Delivery Carriers to Tumor for BNCT N. Nakamura <i>et al.</i> (29121)	179
CO7-4	<i>In vivo</i> Biodistribution Study of new Boron-containing Compound BN2017 for BNCT R. Ubagaki <i>et al.</i> (29122)	180
CO7-5	Severe Adversed Effects after BNCT N. Kamitani <i>et al.</i> (29127)	181
CO7-6	Boron Neutron Capture Therapy Combined with Early Successive Bevacizumab Treatments for Recurrent Malignant S.I. Miyatake <i>et al.</i> (29129)	182
CO7-7	Research on Pretreatment or Concomitant Drug to Augment Therapetutic Effect of BPA-BNCT	102
CO7-8	M. Suzuki and H. Tanaka (29130) The Effect of Boron Neutron Capture Therapy (BNCT) on Normal Tissues or Organs in Mice	183
	M. Suzuki <i>et al.</i> (29131)	184

8. Neutron Radiography and Radiation Application

CO8-1	Research and Development of a Neutron Two-dimensional Position Sensitive Detector System	
	S. Satoh <i>et al.</i> (29051)	185
CO8-2	Multi-element Analysis of Cultivated Oysters by Neutron Activation Analysis	
	M. Fukushima et al. (29057)	186
CO8-3	First Result of Neutron Imaging at Reactor with Neutron Flat Panel Detector	
	T. Fujiwara and H. Hino (29081)	187
CO8-4	Development of Neutron Source and Neutron Detector for Non-destructive Assay of	
	Nuclear Materials	
	Y. Takahashi et al. (29109)	188
CO8-5	Integral Test for the Development of Nondestructive Methods Adopted for	
	Integrity Test of Next Generation Nuclear Fuels (N-DeMAIN)	
	K. Nakajima et al. (29120) ·····	189

9. TRU and Nuclear Chemistry

191
192
193
194

CO9-6	Search for the Vacuum Ultraviolet Photons from ^{229m} Th Reacted with HF Gas Y. Yasuda <i>et al.</i> (29090)	1
CO9-7	Investigation of Coprecipitation with Sm Hydroxide Using KUR Multitracer Y. Kasamatsu <i>et al.</i> (29092)	1
CO9-8	Effect of γ-Ray Irradiation in HNO ₃ on Adsorptivity of Long-Chain Cyclic Monoamide Resin M. Nogami <i>et al.</i> (29094)	1
CO9-9	Electrochemical Behavior of Zriconium in Molten Chloride Coexisisting Fluoride and Oxide to Develop Processing Nuclear Fuel Debris T. Emori <i>et al.</i> (29102)	1
10. Health Phy	sics and Waste Management	
CO10-1	Estimation Method of Elution Ratio of Radioactive Cs from Incineration Ash with Soil M. Yoneda <i>et al.</i> (29060)	19
CO10-2	Ethnographic Study of Radiation Regulation for Victims Living in a Low Dose Radiation Field post National Decontamination Act in Fukushima M. Takagaki <i>et al.</i> (29104)	20
12. Others		
CO12-1	Profile measurements of Coherent Cherenkov Radiation Matched to the Circular Plane at KURNS-LINAC N. Sei and T. Takahashi (29013)	2
CO12-2	Site Preference of M1/M2 Site of Fe in Pyroxene Structure by Mössbauer Microspectroscopy	
CO12-3	K. Shinoda and Y. Kobayashi (29023) Instrumental Neutron Activation Analysis of Cl, Br, and I in High Purity Titanium Metal T. Miura <i>et al.</i> (29025)	2) 2)
CO12-4	Isotope Dilution-Neutron Activation Analysis on Hafnium Oxide Films T. Takatsuka <i>et al.</i> (29030)	2
CO12-5	The Sturucutre of the DN-polymers under Different Temperature and Humidity T. Tominaga <i>et al.</i> (29033)	2
CO12-6	Electron Induced Noise on Avaranche Photodiode for Ganymede Laser Altimeter of Jovian Icy Satellite Explorer. M. Kobayashi <i>et al.</i> (29052)	20
CO12-7	Beam Test of a Micro-cell MWPC for a Muon-electron Conversion Search Experiment, DeeMe M. Aoki <i>et al.</i> (29080)	2
CO12-8	Influence of Submerged Condition and Soil on the Cadmium and Arsenic Concentration of Brown Rice T. Inamura <i>et al.</i> (29086)	2
CO12-9	Production and Purification of ⁴³ K and ¹³⁶ Cs T. Kubota <i>et al.</i> (29103)	2
CO12-10	Evaluation of SEE tolerance for On-board Computer used in Lean Satellite by using 252 Cf	
CO12-11	H. Masui <i>et al.</i> (29111) Growth of Adsorbed Additive Layer for Further Friction Reduction Confirmed by Multi-Analytical Methods Including Neutron Reflectometry T. Hirayama <i>et al.</i> (29113)	2
CO12-12	Morphorogy Analysis of Precipitates in Cu Alloys with SAXS Measurement T. Miyazawa and Y. Tanaka (29114)	2
CO12-13	Biophysical Studies of <i>Bacillus subtilis natto</i> Y. Yanagisawa <i>et al.</i> (29117)	2

ANNUAL SUMMARY OF EXPERIMENTAL RESEARCH ACTIVITIES

I-1. PROJECT RESEARCHES

I-2. COLLABORATION RESEARCHES

- 1. Slow Neutron Physics and Neutron Scattering
- 2. Nuclear Physics and Nuclear Data
- 3. Reactor Physics and Reactor Engineering
- 4. Material Science and Radiation Effects
- 5. Geochemistry and Environmental Science
- 6. Life Science and Medical Science
- 7. Neutron Capture Therapy
- 8. Neutron Radiography and Radiation Application
- 9. TRU and Nuclear Chemistry
- 10. Health Physics and Waste Management
- 12. Others

KURRI Progress Report 2017

Issued in August 2018

Issued by the Institute for Integrated Radiation and Nuclear Science, Kyoto University Kumatori-cho, Sennan-gun, Osaka 590-0494 Japan

> Tel. +81-72-451-2300 Fax. +81-72-451-2600

In case that corrections are made, an errata will be provided in the following webpage: https://www.rri.kyoto-u.ac.jp/PUB/report/PR/ProgRep2017/ProgRep2017.html

Publication Team

HASEGAWA, Kei INO, Yuta INOUE, Rintaro (Subchief) ITO, Kei IWASE, Tomohiro MORI, Kazuhiro (Chief) NAKAYAMA, Chiyoko SAITO, Takeshi SAKURAI, Yoshinori (Subchief) SEKIMOTO, Shun SANO, Hiroaki TSURUTA, Yachiyo YOKOTA, Kaori